

Amendments to the Specification:

Please replace the title on page 1 with the following title:

Mapping of Block-Encoded Data Formats onto a ~~Byte/Bit~~ Bit/Byte
Synchronous Transport Medium

Please replace the paragraph beginning on page 1, line 17 with the following amended paragraph:

Unfortunately, we have observed that this line encoding mechanism is highly inefficient when the same information needs to be transported over a ~~byte/bit~~ bit/byte synchronous transport medium such as a SONET/SDH (Synchronous Optical Network/Synchronous Digital Hierarchy) network (e.g., see ITU-T Recommendation G.707) or an Optical Transport Network (e.g., see ITU-T Recommendation G.709). Therefore, we propose an alternative encoding mechanism based on a variable length protocol data unit (PDU) that provides more efficient encoding for a ~~byte/bit~~ bit/byte synchronous transport medium than the above-described block-encoded format. In particular, block encoded data is first decoded to remove the block encoding and then the unencoded data is mapped into a variable length PDU for transmission over a ~~byte/bit~~ bit/byte synchronous transport medium.

Please replace the paragraph beginning on page 2, line 18 with the following amended paragraph:

The inventive concept is described in the context of information, conveyed via a Fibre Channel (FC) signal, being transported over a ~~byte/bit~~ bit/byte-

synchronous transport medium such as a SONET/SDH (Synchronous Optical Network/Synchronous Digital Hierarchy) but is not so limited. Familiarity with FC is assumed. An illustrative communications system 10 in accordance with the principles of the invention is shown in FIG. 1. Other than the inventive concept, the elements shown in FIG. 1 are well-known and will not be described in detail. For example, 8b/10b decoder 105 decodes a fibre channel signal 101 as known in the art (e.g., see the above-mentioned ANSI X.3230-1994 Fibre Channel Physical and Signaling Standard (FRC-PH)). (In Fibre Channel, data, clock, and word synchronization are carried in one signal. The FC-1 layer specifies 8b/10b coding. This coding packages eight-bit data bytes into balanced ten-bit transmission signals. That is, the number of 1s and 0s transmitted is balanced within one bit at word boundaries, whether measured over run lengths of one word or millions.) Also, although shown as single functional elements, each element (or combination of elements) may be implemented using one, or more, stored-program-control processors, memory, and appropriate interface cards (not shown in FIG. 1). Further, the inventive concept is implemented using conventional programming techniques, which ~~as such,~~ will not be described herein.

Please replace the paragraph beginning on page 3, line 6 with the following amended paragraph:

Communications system 10 comprises a transmitter portion 100 and a receiver portion 200 (described below). Transmitter portion 100 comprises ~~8b/10~~ 8b/10b decoder 105, transmit (Tx) data FIFO (first-in, first-out) 110 (also referred to herein as the transmit buffer) and simplified data link (SDL) encoder (or mapper) 115. Transmitter portion 100 receives an FC signal 101 and, in

accordance with the invention, remaps the information conveyed by FC signal 101 into the SDL protocol for transmission over SONET/SDH transport medium 11. In particular, 8b/10b decoder 105 receives FC signal 101, which represents block encoded data. 8b/10b decoder 105 removes the block encoding from the data and provides the data to Tx Data FIFO 110. The latter provides a buffer for the data as known in the art. (It should be noted that Tx FIFO 110 is sized to find the length of the maximum size packet plus encode look ahead (Layer 1/Layer 2 (L1/L2) specific).) Tx data FIFO 110 provides the received data, in a first-in, first-out, fashion to SDL encoder 115, which formats the signal into packets based upon the simplified data link (SDL) protocol (described below). (Although known in the art, additional information on the simplified data link protocol can be found in the U.S. Patent application of Doshi et al., entitled "Simple Data Link (SDL) Protocol," Serial No. 09/039112, filed 03/13/1998.)

Please replace the paragraph beginning on page 4, line 13 with the following amended paragraph:

An illustrative method to use in transmitter portion 100 is shown in FIG. 3. In step 405, transmitter portion 100 receives the next incoming block of encoded data (block code B_i) conveyed via FC signal 101 (of FIG. 1) (alternatively, formatted in accordance with words, W_i , or Order Sets O_i , as known in the art). In step 410, transmitter portion 100 decodes block code B_i . In step 415, transmitter portion 100 evaluates whether the current received block, B_i , is of the same type as the previous received block, B_{i-1} (assumed already in the above-mentioned transmit buffer). If the previous received block, B_{i-1} , is of the same type (e.g., control frame or data frame) as the current received block, B_i , then transmitter

portion 100 pre-processes the received block B_i as required (e.g., by L1/L2 requirements (not described herein)) and stores the received block, B_i , in the above-mentioned transmit buffer in step 425. (It should be noted that, optionally, compression may also be performed on the data at this point. Similarly, the transmitter may pre-process some of the CTR information and convey supplementary control information to the receiver via the T field. For instance, the information from the various types of ordered sets and other special control signals is highly compressible, and hence, represented with a substantially ~~reduce~~ reduced set of codepoints via the T field. In this case, the receiver then recognizes such special codepoints and ~~reconstruct~~ reconstructs the original control information ~~accordingly.))~~ accordingly.) In step 430, transmitter portion 100 checks the amount of data currently stored in the transmit buffer. If the amount of data stored in the transmit buffer is greater than a threshold for the type of data ($T_{hold}[Type]$), then transmitter portion 100 formulates an SDL PDU in step 420 for the buffered data in accordance with the type as shown in FIG. 2 (with the appropriate value for the length field), and returns to step 405 to continue to process incoming block encoded data. However, if the amount of data stored in the transmit buffer is not greater than the threshold, $T_{hold}[Type]$, then transmitter portion 100 returns to step 405 to continue to process incoming block encoded data to continue to fill up the transmit buffer. Threshold values for data frames may be determined by the maximum allowed PDU size over the transport medium, for instance. Threshold values for control frames would be typically determined as a tradeoff between transport efficiency and responsiveness to the embedded control information.

Please replace the paragraph beginning on page 7, line 3 with the following amended paragraph:

Although the inventive concept was illustrated in the context of fibre channel, the inventive concept is applicable to other types of transmission. For example, FIG. 5 shows illustrative simplified data link frame formats for conveying an Enterprise Systems Connection (ESCON) signal over a ~~byte/bit~~ bit/byte synchronous transport medium (such as SONET/SDH). Similar to the above described frames for FC, an SDL idle frame 60, SDL/ESCON data frame 70 and SDL/ESCON control frame 80 are shown.